

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, DC 20591

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* In the matter of the petition of	*
* MCDONNELL DOUGLAS HELICOPTER COMPANY (MDHC)	*
* for an exemption from § 27.1(a) of the	*
* Federal Aviation Regulations	*

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Regulatory Docket No. 005SW

DENIAL OF EXEMPTION

By letter dated November 18, 1991, Mr. Larry F. Plaster, Manager, Product Integrity, McDonnell Douglas Helicopter Company, 500 East McDowell Road, Mesa, Arizona 85205-9797, petitioned for an exemption from § 27.1(a) of the Federal Aviation Regulations (FAR) to allow the MD900 helicopter to exceed the 6,000 pound maximum weight limit specified for normal category rotorcraft.

The petitioner requests relief from the following regulation:

Section 27.1(a) states, in pertinent part, that FAR part 27 prescribes airworthiness standards for the issue of type certificates, and changes to those certificates, for normal category rotorcraft with maximum weights of 6,000 pounds or less.

The petitioner's supportive information is as follows:

MDHC states that the MD900 will demonstrate compliance with a significantly more complex and stringent FAR part 27 than all existing normal category rotorcraft. The aircraft design will also incorporate additional safety features that are above and beyond the airworthiness standards of FAR part 27. Those safety features are more than adequate to justify certification of this multiengine normal category rotorcraft for gross weight in excess of 6,000 pounds.

History

At the time of application for the MD900 type certificate, the gross weight of the helicopter was projected to be 5,400 pounds. However, compliance with a more complex and stringent FAR resulted in unanticipated growth of the projected gross weight to 5,800 pounds, which may leave an inadequate weight margin for customer optional equipment. The MD900 is an eight-place occupant design, and MDHC does not foresee the helicopter ever exceeding the nine passenger maximum limitation that is applicable to Transport Category B certification.

Regulatory Precedence

MDHC notes that the preamble to FAR part 29 Amendment 29-21 (including single and multiengine configurations) allows type certification of Transport Category B helicopters of greater than 20,000 pounds that carry nine or less passengers (10 to 11 occupants) and that meet the engine isolation requirements for FAR part 29 Category A certification. The preamble of Amendment 29-21 further states that certification above 20,000 pounds in Category B allows the utilization of increased helicopter capability, providing substantial growth in payload capacity consistent with industry projections, and results in increased productivity and an improved level of safety for passengers. Exempting the MD900 from the 6,000 pound limit provides the same increased utility as relief from the Category A requirement previously imposed on rotorcraft exceeding 20,000 pounds, while maintaining the same level of safety for persons on the ground.

MDHC further notes that the notice of the proposed interim criteria for normal category powered lift vehicles allows for certification in the normal category for vertical lift aircraft of up to 20,000 pounds. The notice stated, "...these proposed factors are in general agreement with established airplane and rotorcraft requirements." The same philosophy should also apply to normal category rotorcraft as long as passenger capability is restricted to nine or less.

The petitioner notes that in NPRM 80-25, which led to Amendment 29-21, the FAA recognized the need for a utility category of helicopter over 6,000 pounds and a need for consistency between airplane and rotorcraft imposed safety standards. The petitioner contends that if single engine normal category airplanes of FAR part 23 airworthiness standards weighing 12,500 pounds pose an acceptable level of safety, restricting normal category rotorcraft to 6,000 pounds is not justified. The petitioner points out that rotorcraft represent a lower hazard than an airplane of comparable size and weight due to the rotorcraft's ability to autorotate to a small landing area with low touchdown speed.

Compensating Safety Features of the MD900 Design

MDHC states that the MD900 design incorporates the following features that enhance safety and reduce hazards to persons on the ground:

- Multiengine Category A engine isolation
- NOTOR Antitorque System
- Fire protection not previously required for normal category rotorcraft
- Sliding seats for all occupants and recent FAR part 27 occupant restraint requirements

Increased Regulatory Stringency

Throughout the history of normal category rotorcraft certification, there has been a trend of weight growth resulting from ever-increasing regulatory stringency. The petitioner contends that recent changes to FAR part 27 have made it nearly impossible to develop a twin engine normal category rotorcraft design of less than 6,000 pounds. The public demand for twin engine rotorcraft is increasing. These recent regulatory requirements in FAR part 27 are

- Fire protection of critical components; FAR 27.863, Amendment 27-16.
- Occupant restraint; Amendment 27-25.
- Lightning protection; Amendment 27-21.
- Damage tolerance of composite structure; special conditions.
- HIRF protection; recent FAA policy.
- Additional safety equipment and navigation/communication equipment, FAR parts 91 and 135.

MDHC feels that the current twin engine FAR 27 helicopters in the 5,000 pound and up range would likely exceed 6,000 pounds if required to meet the latest regulatory requirements.

Petitioners Conclusion

MDHC believes that "the requested exemption from the FAR part 27, 6,000-pound gross weight limitation for the MDHC Model MD900 design is fully justified by regulatory precedence, compensating safety features, and public interest to accommodate increased regulatory stringency."

A summary of the petition was published in the Federal Register on February 5, 1992 (57 FR 4508), and three comments were received.

The FAA's analysis/summary is as follows:

The FAA has given careful consideration to the petitioner's justification for an exemption and also considered arguments submitted by the three commenters. Two of the commenters strongly disagreed with the premise for the requested exemption. The third commenter, the petitioner, supported the exemption with an unpersuasive argument addressed later.

The two commenters that strongly disagreed with the petitioner's justification for the exemption suggest that a change to the FAR part 27 weight limit should be the subject of a careful study involving all affected parties and not driven by an unanticipated weight growth of the MD900 design. One commenter states that the issue transcends the MD900 design and apparent weight growth and should be studied by the entire rotorcraft community. The commenter further states that the

potential impact of safety cannot be ignored to satisfy a "short-fused" petition for exemption. The other commenter states that a change to the applicability of FAR part 27 in order to account for inadequate weight planning by the petitioner is unjustified.

In his supporting comment, the petitioner claims that the Agusta Model 109K2 was effectively granted an exemption to FAR 27.1(a) by the Italian Airworthiness Authority (RAI) that certificated the helicopter in the normal category at a weight of 2,900 kilograms (6,393 pounds). However, that claim is unpersuasive. Although the A109K2 demonstrated compliance to FAR 27 at a weight of 2,850 kilograms (6,284 pounds), the helicopter was certificated by the RAI for a maximum gross weight of 6,000 pounds. The Swiss Airworthiness Authority (SFOCA), on the basis of the assessment at 2,850 kilograms, has subsequently granted authorization to operate the A109K2 at that weight in Switzerland. However, the FAA does not subscribe to any current or future certification of that aircraft for a gross weight above 6,000 pounds.

MDHC argues that the Category B certification of part 29 helicopters that exceed 20,000 lbs. maximum weight; that meet the Category A requirements of Subparts C, D, E, and F; and that have fewer than 10 passenger seats is analogous to the certification of part 27 helicopters in excess of 6,000 lbs. maximum weight that meet the Category A engine isolation requirements of part 29. The FAA disagrees with the petitioner. The intent of FAR 29.1(d) is to exclude large helicopters, employed primarily to transport cargo, from the Category A requirements intended for helicopters that are employed primarily in the transportation of passengers.

The proposed Interim Certification Criteria for normal category Powered-Lift Vehicles (PLV) imposes a maximum weight of 20,000 lbs. and maximum passenger seating of nine. MDHC believes that the same philosophy and criteria should be applied to normal category rotorcraft. The FAA disagrees with the petitioner. A weight of 20,000 pounds is greatly in excess of the weight needed for a normal category helicopter that is efficiently designed to transport nine passengers. On the other hand, in the current state of technology and design complexity, it is anticipated that a PLV configured for nine passengers may approach 20,000 lbs. maximum weight.

The petitioner states that a rotorcraft, when compared to a similar size airplane, represents a significantly lower hazard to persons on the ground due to the rotorcraft's capability of autorotating and landing at a small landing site at relatively slow speed. The validity of arguing the merits of autorotational performance, for a multi-engine helicopter with engine isolation, is suspect. However, a counter argument is that the airplane's significantly greater glide ratio and typical operating altitude give its pilot a much greater area from which to select a landing site and, therefore, may pose less risk to people on the ground than a similar size helicopter. The FAA is unable to conclusively support or reject this argument without a detailed analysis of accident data.

The FAA knows that, as one of the newest normal category rotorcraft designs, the MD900 will meet a more stringent FAR part 27 standard than has been met previously. The latest helicopter design to be certificated typically meets a more stringent FAR standard than its predecessors. However, with the certification basis unchanged for 3 years prior to issuance of a normal category type certificate, the applicant is given sufficient time to consider the design requirements imposed by the latest applicable amendments and to plan accordingly.

Although the FAA recognizes that some of the MD900 design features are "above and beyond the basic FAR part 27 requirements," those features only exceed the requirements of amendments that have since been superseded. Any applicant applying for a normal category rotorcraft type certificate today will have to incorporate similar design features to meet the minimum standards set forth in the latest amendments of FAR part 27. Additionally, special conditions or rules regarding HIRF protection adopted for a particular type design would have to be addressed. Also, the special conditions or policy and procedures governing damage tolerance of composite structures must be met by any new helicopter design constructed of such material.

The FAA notes that MDHC has elected to meet the FAR part 29 Category A multiengine isolation requirements; this, while commendable, does not exempt the MD900 from the 6,000 pound maximum weight limit of FAR part 27. MDHC will derive benefits, such as relief from all engine-out (power-off) height-velocity testing and controllability requirements, which should partially offset the penalties of increased weight and design complexity.

While NOTAR is an innovation, the incorporation of that design feature does not justify an increase in maximum allowed weight on the basis of reduced hazards to persons on the ground.

Finally, the petitioner did not delineate factors affecting the public interest in granting such an exemption.

In April of 1992, the FAA solicited comments on the subjects of weight limit, passenger seat limit, and minimum safety standard criteria for normal category rotorcraft. To date, the 22 commenters represent manufacturers, operators, and civil airworthiness authorities. The commenters have raised many issues concerning the present weight limits and associated items. Therefore, the FAA has determined that it is in the public interest to thoroughly review this issue in a public forum.

Based on the preceding discussion, the FAA has determined that a grant of exemption has not been adequately justified nor shown to be in the public interest. Therefore, pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the petition of MDHC for an exemption from

§ 27.1(a) of the FAR to allow type certification of the Model MD900 helicopter at a weight exceeding 6,000 pounds is hereby denied.

Issued in Fort Worth, Texas, on April 13, 1993.


Manager, Rotorcraft Directorate,
Aircraft Certification Service